

## ABSTRACT OF THE INVENTION

The present invention provides methods for producing sialyloligosaccharides in situ in dairy sources and cheese processing waste streams, prior to, during, or after processing of the dairy source during the cheese manufacturing process. The methods of the present invention use the catalytic activity of  $\alpha(2-3)$  trans-sialidases to exploit the high concentrations of lactose and  $\alpha(2-3)$  sialosides which naturally occur in dairy sources and cheese processing waste streams to drive the enzymatic synthesis of  $\alpha(2-3)$  sialyllactose.  $\alpha(2-3)$  sialyloligosaccharides produced according to these methods are additionally encompassed by the present invention. The invention also provides for recovery of the sialyloligosaccharides produced by these methods. The invention further provides a method for producing  $\alpha(2-3)$  sialyllactose. The invention additionally provides a method of enriching for  $\alpha(2-3)$  sialyllactose in milk using transgenic mammals that express an  $\alpha(2-3)$  trans-sialidase transgene. The invention also provides for recovery of the sialyllactose contained in the milk produced by this transgenic mammal either before or after processing of the milk. Transgenic mammals containing an  $\alpha(2-3)$  trans-sialidase encoding sequence operably linked to a regulatory sequence of a gene expressed in mammary tissue are also provided by the invention.

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